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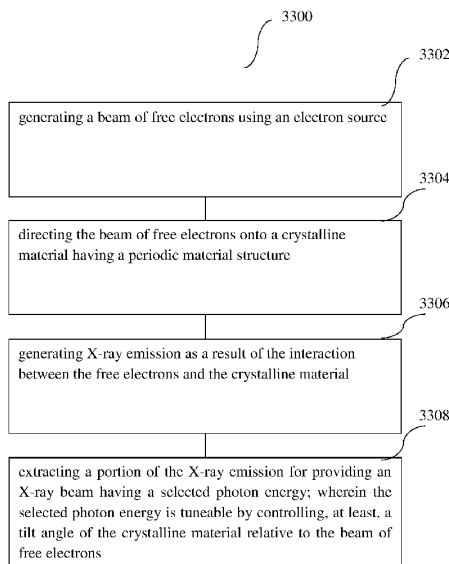
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(54) Title: APPARATUS AND METHODS FOR GENERATING TUNABLE X-RAYS VIA THE INTERACTION OF FREE ELECTRONS WITH PERIODIC STRUCTURES



(57) Abstract: A method of generating X-ray emission, and a system for generating X-ray emission are provided. The method comprises the steps of generating a beam of free electrons using an electron source; directing the beam of free electrons onto a crystalline material having a periodic material structure; generating X-ray emission as a result of the interaction between the free electrons and the crystalline material; and extracting a portion of the X-ray emission for providing an X-ray beam having a selected photon energy; wherein the selected photon energy is tunable by controlling, at least, a tilt angle of the crystalline material relative to the beam of free electrons.

Figure 33

[Continued on next page]

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